



## Implementing PeerWise to engage students in collaborative learning.

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## Short Communication

# Implementing PeerWise to engage students in collaborative learning

Stephen McClean

### Introduction

PeerWise (<https://peerwise.cs.auckland.ac.nz/>) is an online tool which encourages collaborative and independent learning by facilitating students in the creation and sharing of multiple choice questions (MCQs) relevant to their course of study. Students may answer, rate and comment on questions set by peers and follow authors who create high quality MCQs. Students may also provide feedback that is made available when a correct or incorrect answer is chosen. If students feel that a question is not written clearly, or that the answer provided is not correct, this may be challenged and the question edited or withdrawn. As students interact with PeerWise they build up a reputation score and earn badges, thus providing an incentive for engagement.

PeerWise was created by Paul Denny (Denny, Hanks, Simon, & Bagley, 2011; Denny, 2013) and resides on servers at the University of Auckland, New Zealand. A large number of universities and colleges worldwide have employed PeerWise in their courses and an increasing body of literature is growing around its application as a collaborative learning tool. Studies exist demonstrating how PeerWise has been used in subject areas such as Organic Chemistry (Ryan, 2013); Physics (Bates, Galloway, & McBride, 2012); the Biosciences (Tierney & Sykes, 2011); Teacher Education (Mackey, Davis, Donna, Gikandi, & Dabner, 2012); Medicine (Rea & McClure, 2012); Nursing (Rhodes, 2013), and computing (Devon, Paterson, Moffat, & McCrae, 2012).

### Description of the PeerWise Activity

PeerWise was used for the first time at Ulster University in 2013/14 in a year one Biochemistry module in the School of Biomedical Sciences with 195 students enrolled. The module has a broad diversity of students drawn from courses within the Faculty of Life and Health Sciences,

namely, Biology, Biomedical Sciences, Dietetics, Food and Nutrition, Human Nutrition and Pharmacy.

Students entering University bioscience courses often come with a good prior-experience of biology and chemistry at A-level or equivalent. Biochemistry, however, is a topic that many have not encountered before and therefore require additional support in their learning. Students often cite online self-assessment questions as a useful means of support when dealing with new topics; therefore, it was decided that two important factors would be addressed by implementing PeerWise:

1. Students would be prompted to engage more with module material as they fulfilled the task of creating MCQs relevant to the topics being covered.
2. A repository of self-assessment questions would be created by students for revision and peer learning purposes.

Given the relatively large numbers of students on the module, an online system which would facilitate easy registration and management was required.

### Design of the PeerWise Activity

An account was created on the PeerWise website (<http://peerwise.cs.auckland.ac.nz/>) for Ulster University and a module area with its own unique identification number created for BMS102 Biochemistry. A list of student ID numbers was uploaded to the site as “identifiers” of the students to be involved. Students were provided with the module identification number and then asked to create an account on the PeerWise site. Only those whose student identifier number had been previously uploaded were admitted to the module area. While use of student number is not a contravention of Data Protection policy, it has been suggested that an identifier other than student number be used for better data security. For PeerWise, any identifying number may be assigned to a student so long as a record is maintained by the lecturer to track activity; all activity by students is anonymous to the peer group.

The PeerWise website contains a number of user guides for both staff and students and the processes of registration and participation are intuitive. For the BMS102 activity, students were asked to complete the following tasks on PeerWise:

1. Create 1 MCQ per week of teaching;
2. Answer any 3 MCQs (created by other students) per week of teaching;
3. Comment on any 2 MCQs (created by other students) per week of teaching.

A small number of coursework marks (5%) were assigned to students who successfully completed the activity. Additional marks were also provided to those who had higher levels of engagement with PeerWise as evidenced by their reputation scores. Student engagement was measured at two checkpoints, one in week 8 and the other in week 12. This encouraged students to engage throughout the semester and not leave all of the activity until week 12.

Some of the PeerWise questions written by students were included in two summative class tests during the semester, providing a further incentive for engagement. Students were provided with a guide on how to write good MCQ questions along with guidance on the activity to be completed. A link to these documents is provided at the end of this report.

## Results and Impact

By the end of the teaching period 2,411 questions had been created by 194 out of the 195 students on the module; 28,239 answers had been provided and 9,275 comments posted, evidencing a high level of engagement. Figure 1a shows the number of questions submitted per day from 28<sup>th</sup> January 2014 to 1<sup>st</sup> May 2014, the maximum being 203 questions authored on 21<sup>st</sup> March, the date of the first checkpoint to measure student engagement.

Figure 1b provides information on the number of questions answered per day. High levels of engagement are noted around 25<sup>th</sup> February (2,767

questions answered) and 1<sup>st</sup> April, the dates of the two summative class tests, indicating that students utilised PeerWise extensively in their revision of module material prior to these assessments. Students were informed that the sessional examination in May 2014 would not contain PeerWise questions; despite this, there is a clear evidence of PeerWise being used as a revision tool with in excess of 3,100 questions answered in the period from 28<sup>th</sup> April to the date of the examination on 12<sup>th</sup> May 2014.

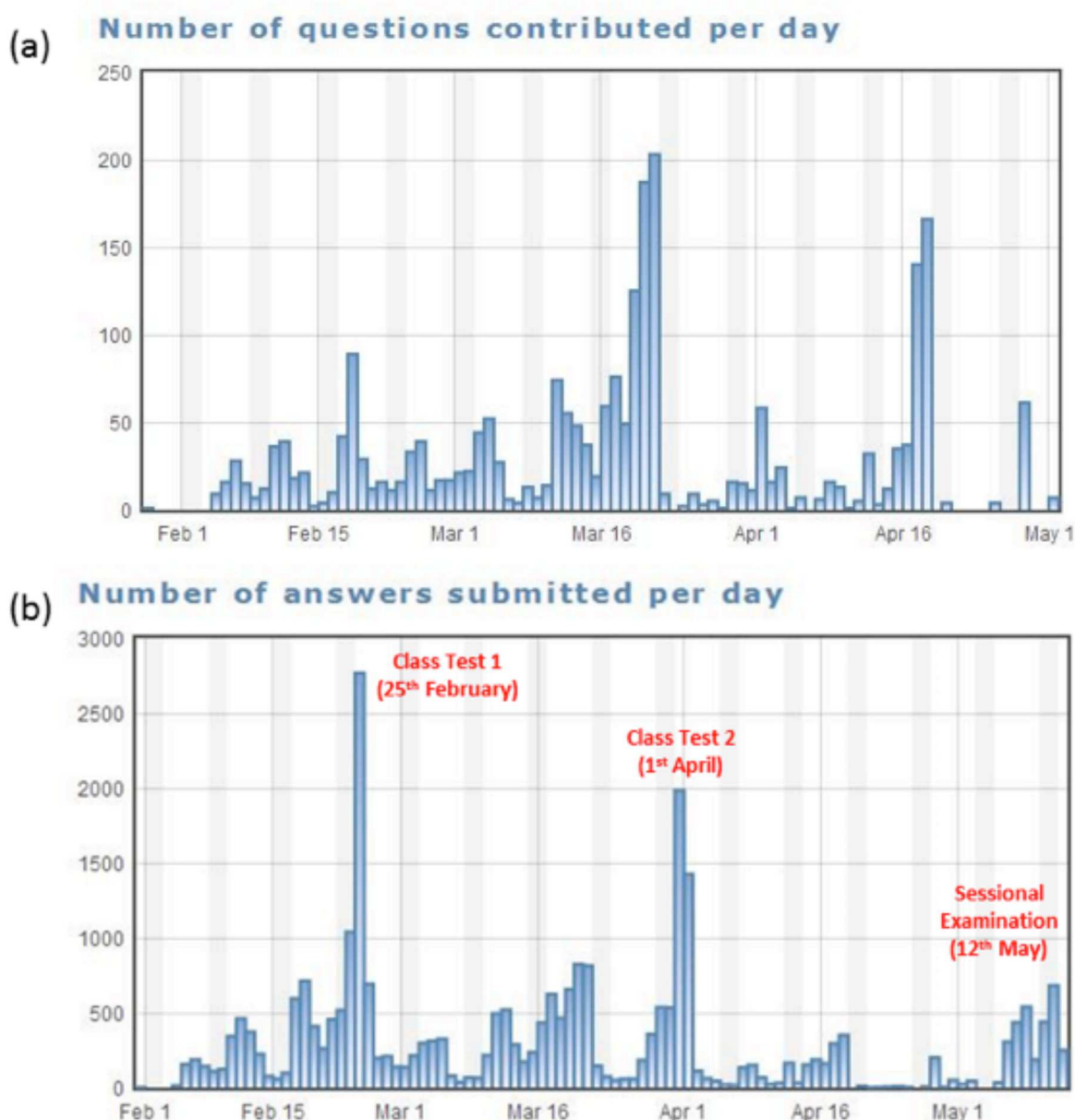


Figure 1 (a) Summary of the number of PeerWise questions contributed per day during semester two, 2013/14 on the module BMS102 Biochemistry.  
 (b) Number of answers submitted per day with the dates of summative class tests and examination indicated.



Module evaluation was carried out using the Ulster University Module Feedback Survey ([feedback.ulster.ac.uk/](https://feedback.ulster.ac.uk/)). For BMS102 Biochemistry there were 86 respondents from a total enrolment of 195 students (44.1% response). In the qualitative comments in response to the question “What did you feel was particularly good about this module?” a number of students commented favourably on PeerWise.

This is evidenced by the Wordle ([www.wordle.net](http://www.wordle.net)) in Figure 2 of all comments received in this section. The larger the font of the word, the more times the word appears, and “PeerWise” dominates.

Some comments from students are provided below:

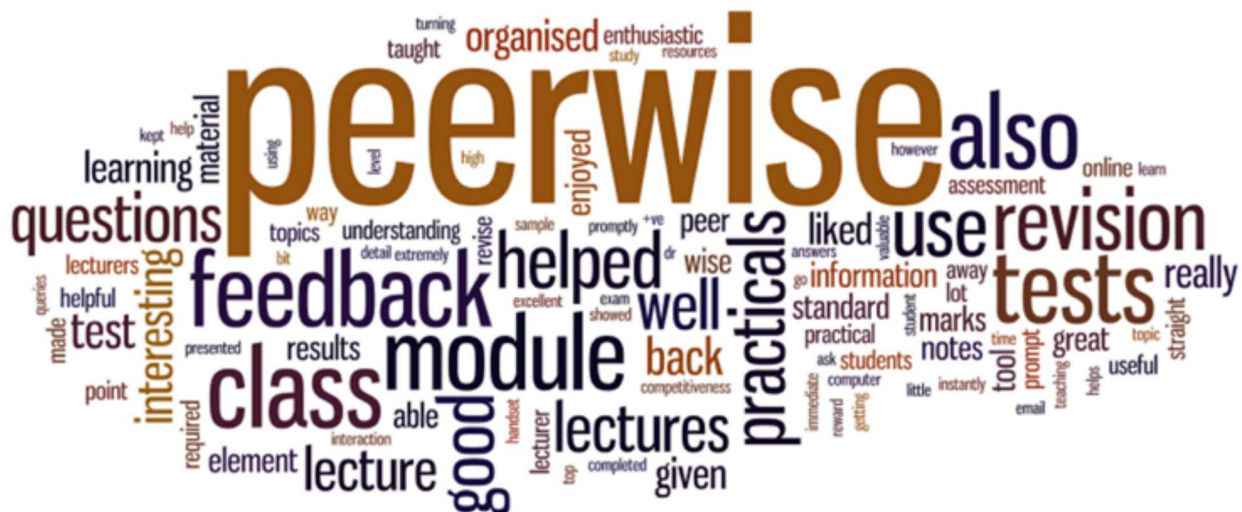


Figure 2: Wordle ([www.wordle.net](http://www.wordle.net)) derived from qualitative responses to the question “What did you feel was particularly good about this module?” from the Ulster University Module Feedback Survey ([feedback.ulster.ac.uk/](http://feedback.ulster.ac.uk/)) for module BMS102 Biochemistry in the 2013/14 academic year.

“I enjoyed the PeerWise element as it encouraged me to go out and learn my notes. I liked the competitiveness.”

“Peerwise was a good learning tool”

“I felt that the introduction of PeerWise made this module better because you were able to ask your fellow peers about the topics learnt and you were able to answer their questions also.”

“PeerWise was great for learning and revision. I don’t have PeerWise for my other modules and it really helped to reinforce my learning.”

“Peerwise is a valuable revision tool as I prefer to revise through completing questions, however there can be the odd repeated or non-relevant question, which is a little time wasting.”

A small number of students did suggest that PeerWise could be improved with regard to how marks were assigned, especially for higher levels of engagement above the minimum requirements. One student commented: “Not interested in Peerwise, people are just using it to get marks, it’s hard to learn from it”

### Practitioner Reflections on PeerWise

PeerWise encourages an active approach to learning and facilitates students in creating a large bank of multiple choice questions for revision purposes. Students do require an incentive to take part, and a number of coursework marks were awarded to those who engaged. Additional marks were provided to those who achieved high reputation scores or high numbers of badges. On reflection, this may have detracted somewhat from the fun element of the PeerWise activity and it might serve better to provide marks only for those who achieve the set quota of questions created, answered and commented upon. A leader board was used based on cohort group within the module and this added to the competitiveness of the activity.

It was evident that many students exceeded the minimum requirement for participation, with one student creating in excess of 90 questions and writing over 1000 comments on questions. This behaviour appears to be in agreement with colleagues who have implemented PeerWise elsewhere (Ryan, 2013). In some cases the comments written are short and uninformative, being more social in nature, while in others they add additional information about the topic being examined or challenge an answer provided.

### Conclusion

In our hands PeerWise provided additional support for students and encouraged active learning. However, as with all teaching innovations, the context in which it is implemented should be carefully considered

rather than a “blanket” imposition across all modules on a course. While the literature reports that the use of PeerWise is successful in improving examination performance (Rea & McClure, 2012), we have still to evaluate this with our year one students.

### Acknowledgement / Supplementary Files

Dr Pedro Barro, Kingston University, is thanked for assistance in implementing the PeerWise project at Ulster and for supplying user guides. Documentation supplied to students at Ulster is available to download from the following address: [bit.ly/PeerWiseFiles](http://bit.ly/PeerWiseFiles).

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